

What is claimed is:

1. A transfer tip for handling an injection molded ophthalmic lens mold, said lens mold having a concave or convex shape and having lens mold handling means thereon, said transfer tip comprising:

5 a substantially rigid body portion having a distal end and a proximal end, said distal end having an outer surface that is complementary to the shape of the lens mold half to be transferred, said body portion having sealing means peripheral to said outer surface for engagement with said lens mold; and

10 at least one aperture extending through said body portion from said distal end to said proximal end.

2. The transfer tip of Claim 1 wherein said substantially rigid body portion is comprised of a material of construction having a Shore D Hardness of about 58 to about 90.

15 3. The transfer tip of Claim 2 wherein said substantially rigid body portion is comprised of a material of construction having a Shore D Hardness of about 75 to about 90.

4. The transfer tip of Claim 1 wherein said substantially rigid body portion is comprised of a polymeric material.

20 5. The transfer tip of Claim 4 wherein said polymeric material is selected from the group consisting of polyacetyls, polystyrenes, polypropylenes, polyethylenes, polyetheretherketones, polyamides, polyimides, polyamideimides, polyfluoroethylenes, polyetherimides, polyesters, polycarbonates, polyethers, polyetherimides, polysulfide polymers, polysulfones, and blends and alloys of the foregoing.

25 5. The transfer tip of Claim 5 wherein said polymeric material is the polyacetyl Delrin®.

6. The transfer tip of Claim 1 wherein said substantially rigid body portion is comprised of metal, ceramic or cellulosic material.

7. The transfer tip of Claim 1 wherein said outer surface is convex.

30 8. The transfer tip of Claim 4 wherein said sealing means peripheral to said convex outer surface is an annular sealing ring.

9. The transfer tip of Claim 1 wherein said outer surface is concave.

10. The transfer tip of Claim 6 wherein said sealing means peripheral to said concave outer surface is an annular sealing ring.

11. The transfer tip of Claim 1 wherein said proximal end has connection means.

12. A transfer tip for handling an injection molded Back Curve lens mold for a soft contact lens, said Back Curve lens mold having a concave surface and an annular flange, said transfer tip comprising:

a substantially rigid polymeric body portion having a distal end and a proximal end, said distal end having a convex outer surface complementary to the concave surface of said Back Curve lens mold, said body portion having an annular sealing ring peripheral to said convex outer surface for engagement with said annular flange; and at least one aperture extending through said polymeric body portion from said distal end to said proximal end.

13. The transfer tip of Claim 12 wherein said substantially rigid polymeric body portion is comprised of a polyacetyl, and said proximal end comprises threaded connection means.

14. A transfer tip for handling an injection molded Front Curve lens mold for a soft contact lens, said Front Curve lens mold having a convex surface and an annular flange, said transfer tip comprising:

a substantially rigid polymeric body portion having a distal end and a proximal end, said distal end having a concave outer surface complementary to the convex surface of said Front Curve lens mold, said body portion having an annular sealing ring peripheral to said concave outer surface for engagement with said annular flange; and at least one aperture extending through said body portion from said distal end to said proximal end.

15. The transfer tip of Claim 14 wherein said substantially rigid polymeric body portion is comprised of a polyacetyl, and said proximal end comprises threaded connection means.

16. A system for handling an injection molded ophthalmic lens mold half, said lens mold half having a concave or convex shape and having lens mold handling means thereon, said system comprising:

a robotic assembly having a transport tip thereon for picking up said lens mold at a first location and depositing said lens mold at a second location, said transfer tip having a substantially rigid body, said body portion having a distal end and a proximal end, said distal end having an outer surface that is complementary to the shape of the lens mold half to be handled, said body portion having sealing means peripheral to said outer surface for engagement with said lens mold handling means, said transfer tip having at least one aperture extending through said body portion from said distal end to said proximal end; and

a source of pressure differential in flow communication with said at least one aperture.

17. The system of Claim 16 wherein said substantially rigid body portion is comprised of a material of construction having a Shore D Hardness of about 58 to about 90.

18. The system of Claim 17 wherein said substantially rigid body portion is comprised of a material of construction having a Shore D Hardness of about 75 to about 90.

19. The system of Claim 17 wherein said substantially rigid body portion is comprised of a polymeric material selected from the group consisting of polyacetyls, polystyrenes, polypropylenes, polyethylenes, polyetheretherketones, polyamides, polyimides, polyamideimides, polyfluoroethylenes, polyetherimides, polyesters, polycarbonates, polyethers, polyetherimides, polysulfide polymers, polysulfones, and blends and alloys of the foregoing.

20. The system of Claim 19 wherein said outer surface is convex; and said sealing means peripheral to said outer surface is an annular sealing ring.

21. The system of Claim 19 wherein said outer surface is concave and said sealing means peripheral to said outer surface is an annular sealing ring.

22. A process for transporting an injection molded ophthalmic lens half from a first location to a second location, said lens mold half having a concave or convex shape and having lens mold handling means thereon, said process comprising:

providing a robotic assembly having a transfer tip thereon, said robotic assembly having means for transporting said lens mold half from said first location to said second

location, said transfer tip having a substantially rigid body, said body portion having a distal end and a proximal end, said distal end having an outer surface that is complementary to the shape of the lens mold half to be transferred, said body portion having sealing means peripheral to said outer surface for engagement with said lens mold handling means, said transfer tip having at least one aperture extending through said body portion from said distal end to said proximal end;

engaging said sealing means with said lens mold handling means and providing a source of differential pressure in flow communication with said at least one aperture sufficient to securely hold said lens mold half to said transfer tip;

10 picking up said lens mold half from said first location;

transporting, by said robotic assembly, said lens mold half to a second location and depositing same thereat.

23. The process of Claim 23 wherein said substantially rigid body portion is comprised of a material having a Shore D Hardness of about 58 to about 90.

15 24. The process of Claim 22 wherein said lens mold half is a Back Curve having a concave surface and an annular flange; said substantially rigid body portion is polymeric; said outer surface is convex; and said sealing means is an annular ring.

25. The process of Claim 22 wherein said lens mold half is a Front Curve having a convex surface and an annular flange; said substantially rigid body portion is 20 polymeric; said outer surface is convex; and said sealing means is an annular ring.

26. A transfer tip for handling an injection molded ophthalmic lens mold having a concave or convex shape and having lens mold handling means thereon, said transfer tip comprising:

25 a substantially rigid body portion having a distal end comprising an annular sealing surface for engagement with said lens handling means; and

a plurality of apertures extending through said annular sealing surface from the distal end to the proximal end of said body portion.

27. The transfer tip of Claim 26 wherein said plurality of apertures are equally spaced around the circumference of the annular sealing surface.

30 28. The transfer tip of Claim 27 wherein said plurality of holes are of uniform size.

29. The transfer tip of Claim 28 wherein said substantially rigid body portion is comprised of a material of construction having a Shore D Hardness of about 58 to about 90.

30. The transfer tip of Claim 29 wherein said substantially rigid body portion is comprised of a polymeric material selected from the group consisting of polyacetyls, polystyrenes, polypropylenes, polyethylenes, polyetheretherketones, polyamides, polyimides, polyamideimides, polyfluoroethylenes, polyetherimides, polyesters, polycarbonates, polyethers, polyetherimides, polysulfide polymers, polysulfones, and blends and alloys of the foregoing.

31. The transfer tip of Claim 30 wherein said substantially rigid body portion is comprised of a polyacetyl.

32. A system for handling an injection molded ophthalmic lens mold half, said lens mold half having a concave or convex shape and having lens handling means in the form of a flange thereon, said system comprising:

a robotic assembly having a transport tip thereon for picking up said lens mold at a first location and depositing said lens mold at a second location, said transfer top having:

a substantially rigid body portion having a distal end having an annular sealing surface for engagement with said lens handling a means; and

a plurality of apertures extending through said annular sealing surface from the distal end to the proximal end of said body portion; and

a source of pressure differential in flow communication with said plurality of apertures.

33. A process for transporting an injection molded ophthalmic lens half from a first location to a second location, said lens mold half having a concave or convex shape and having lens mold handling means thereon, said process comprising:

providing a robotic assembly having a transfer tip thereon, said robotic assembly having means for transporting said lens mold half from said first location to said second location, said transfer tip having a substantially rigid body portion having a distal end comprising an annular sealing surface for engagement with said lens handling means; and

a plurality of apertures extending through said annular sealing surface from the distal end to the proximal end of said body portion;

- engaging said annular sealing surface with said lens mold handling means and providing a source of differential pressure in flow communication with said plurality
- 5 of apertures sufficient to securely hold said lens mold half to said transfer tip;

picking up said lens mold half from said first location;

transporting, by said robotic assembly, said lens mold half to a second location and depositing same thereat.

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